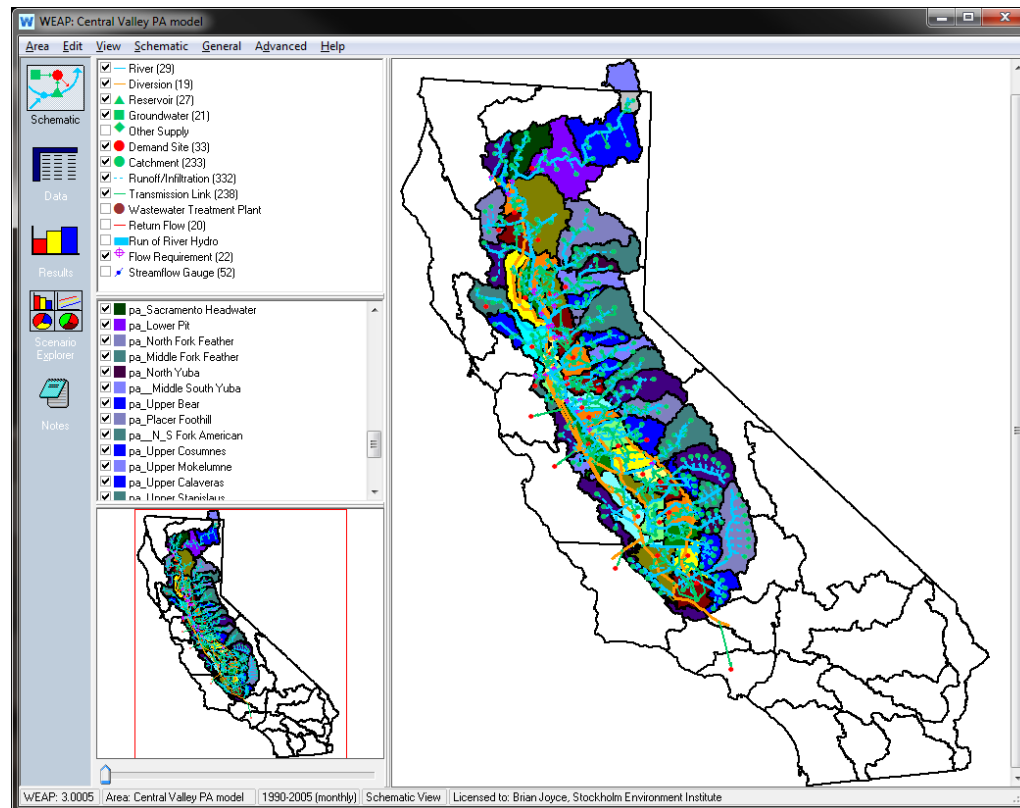


Introduction to the Central Valley WEAP Model



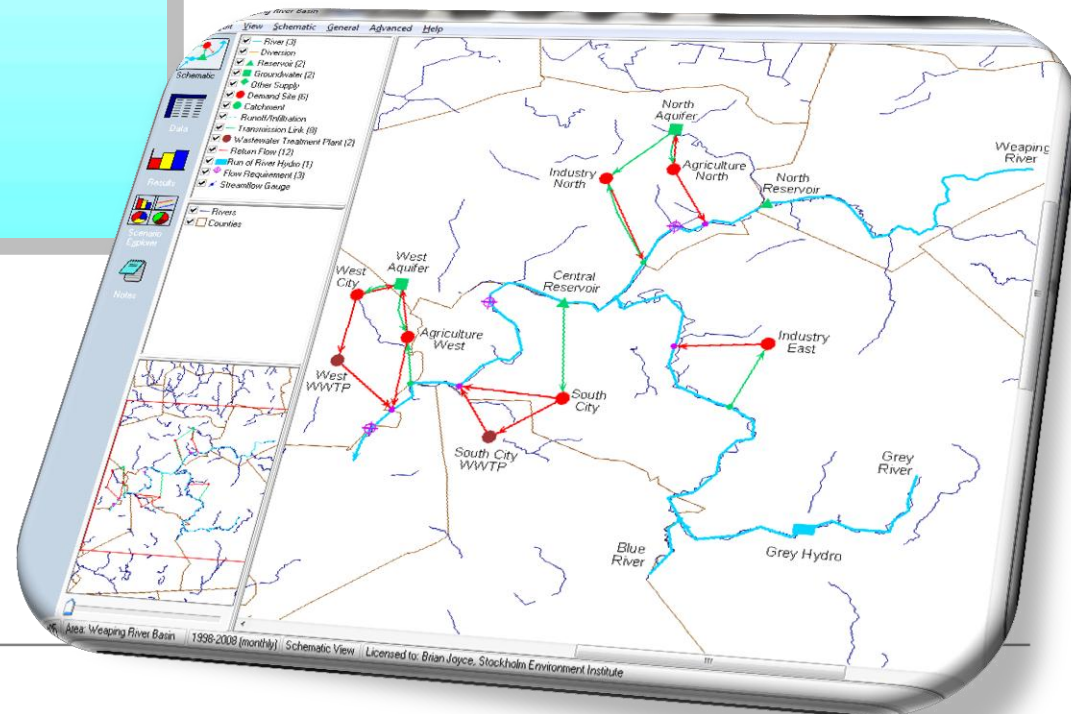
Water Evaluation and Planning (WEAP) System



Water Evaluation And Planning System

Copyright (c) 1990-2008, Stockholm Environment Institute

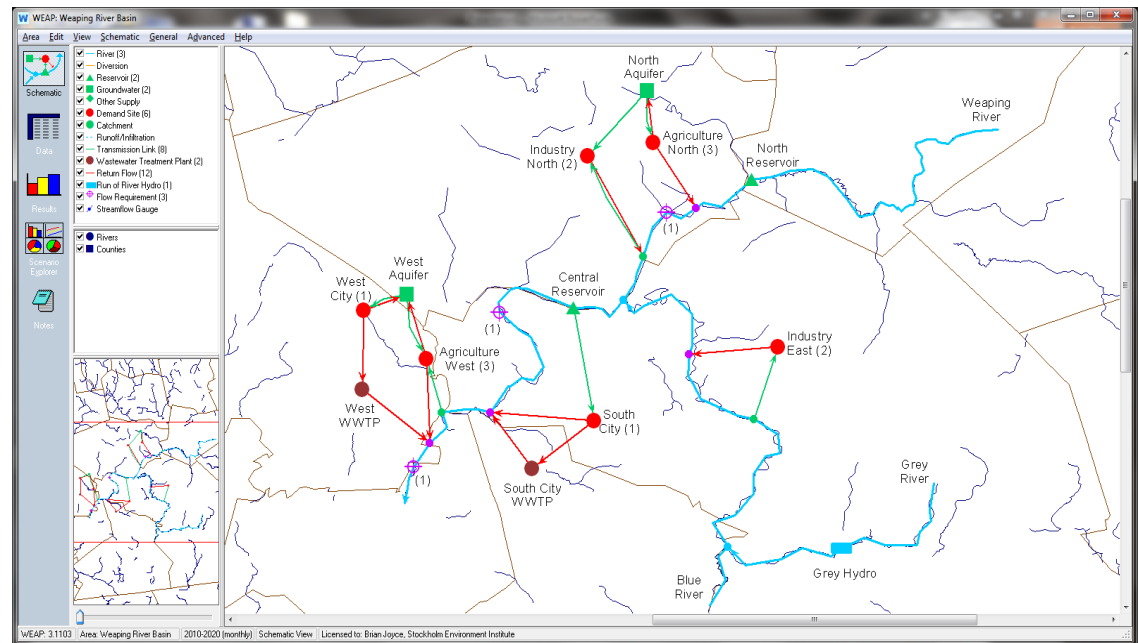
Generic, object-oriented, programmable, integrated water resources management modeling platform



WEAP is a 'water-centric' planning model

WEAP is an allocation model that balances water supplies and demands under different scenarios

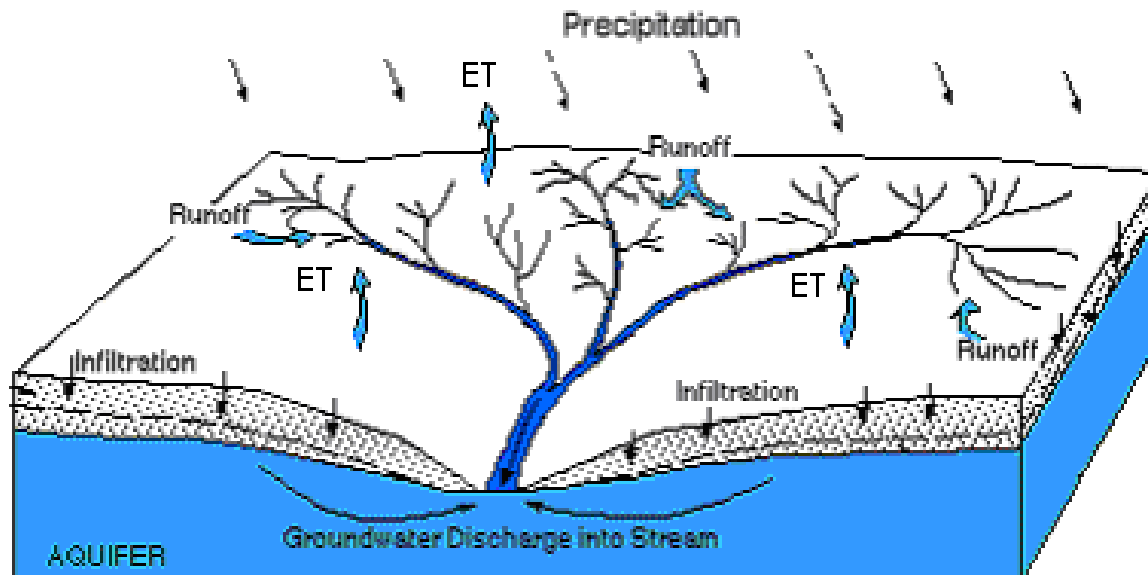
System schematic is set up using a standard set of model objects



WEAP as an Integrated Water Basin Analysis Tool

Full accounting of water flows throughout watershed:

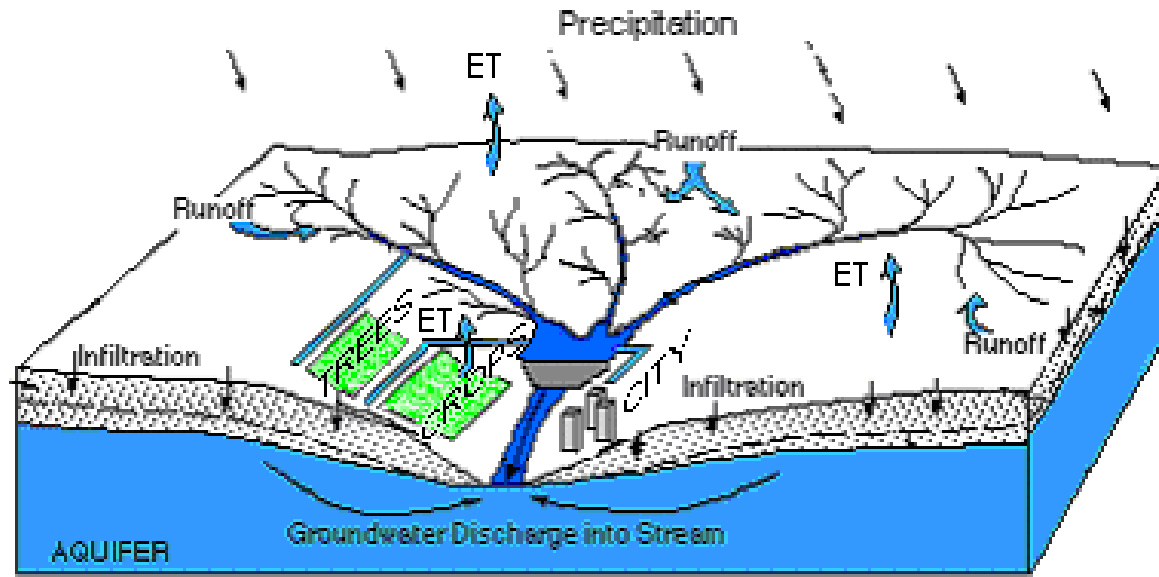
- Rainfall-runoff modeling
- Snow accumulation/melt
- Groundwater-surface water interaction



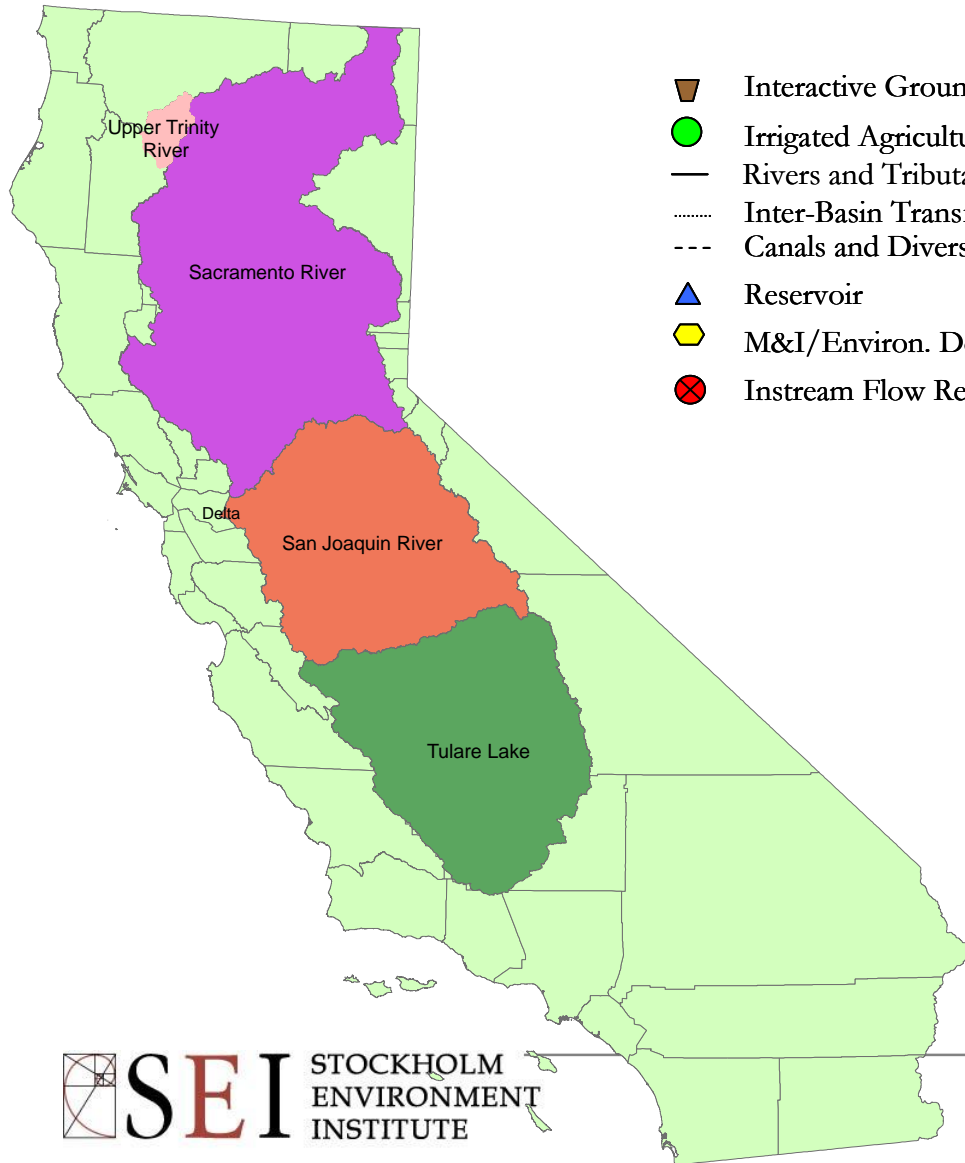
WEAP as an Integrated Water Basin Analysis Tool

Water infrastructure and demands are nested within the underlying hydrological processes

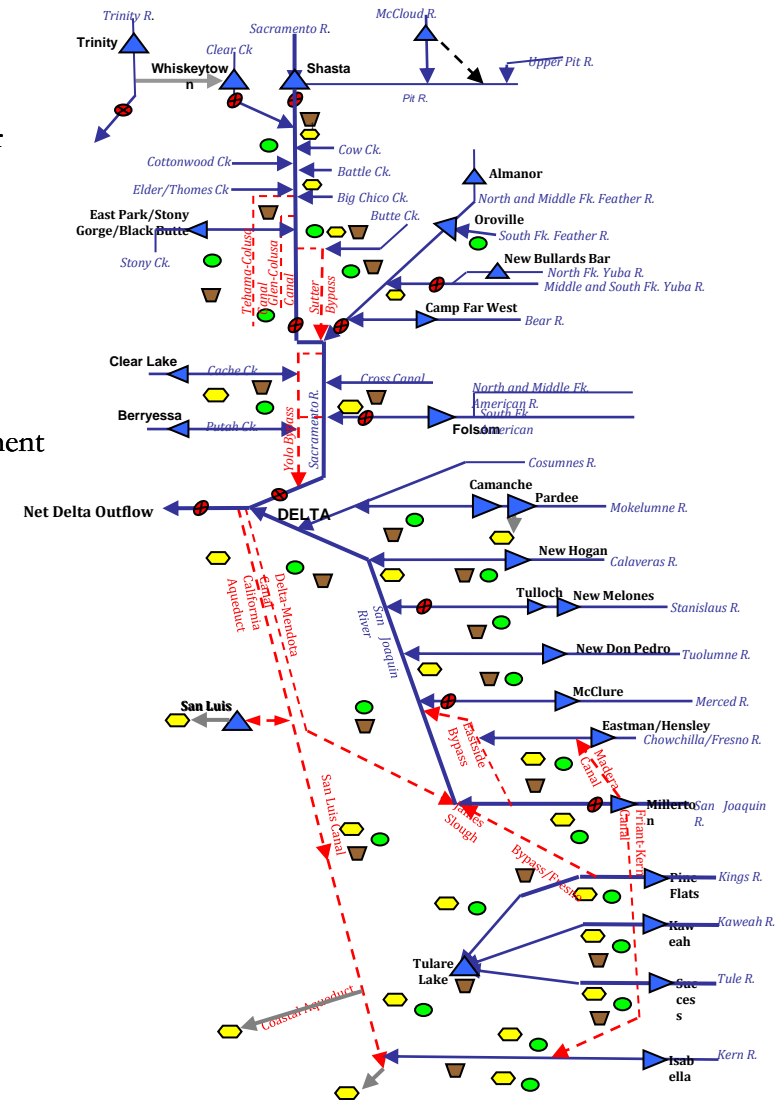
- Programmable operating rules for infrastructure
- Represents water demands from all sectors



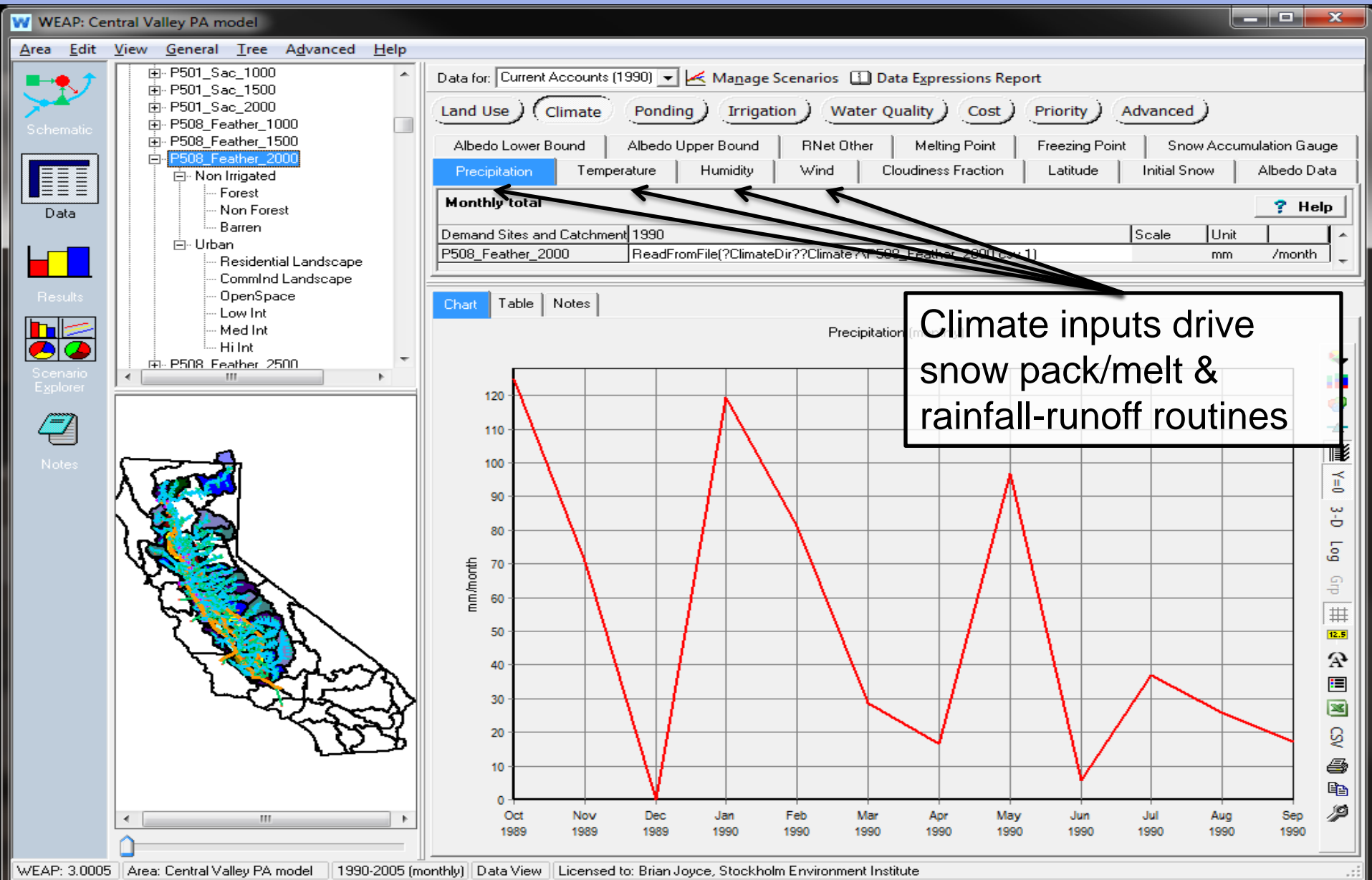
Central Valley Water Management Model



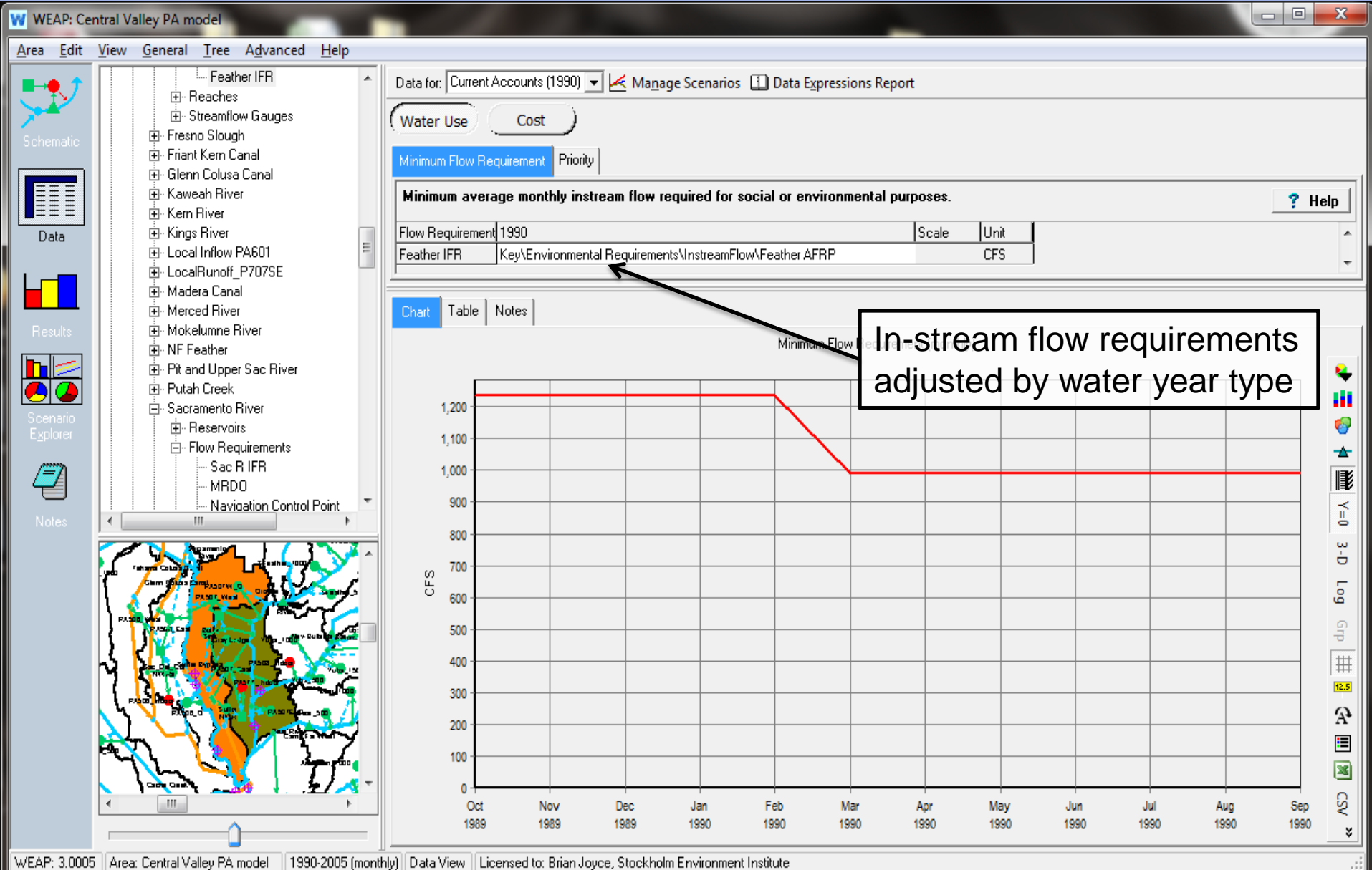
- Interactive Groundwater
- Irrigated Agriculture
- Rivers and Tributaries
- Inter-Basin Transfer
- Canals and Diversions
- Reservoir
- M&I/Environ. Demand
- Instream Flow Requirement



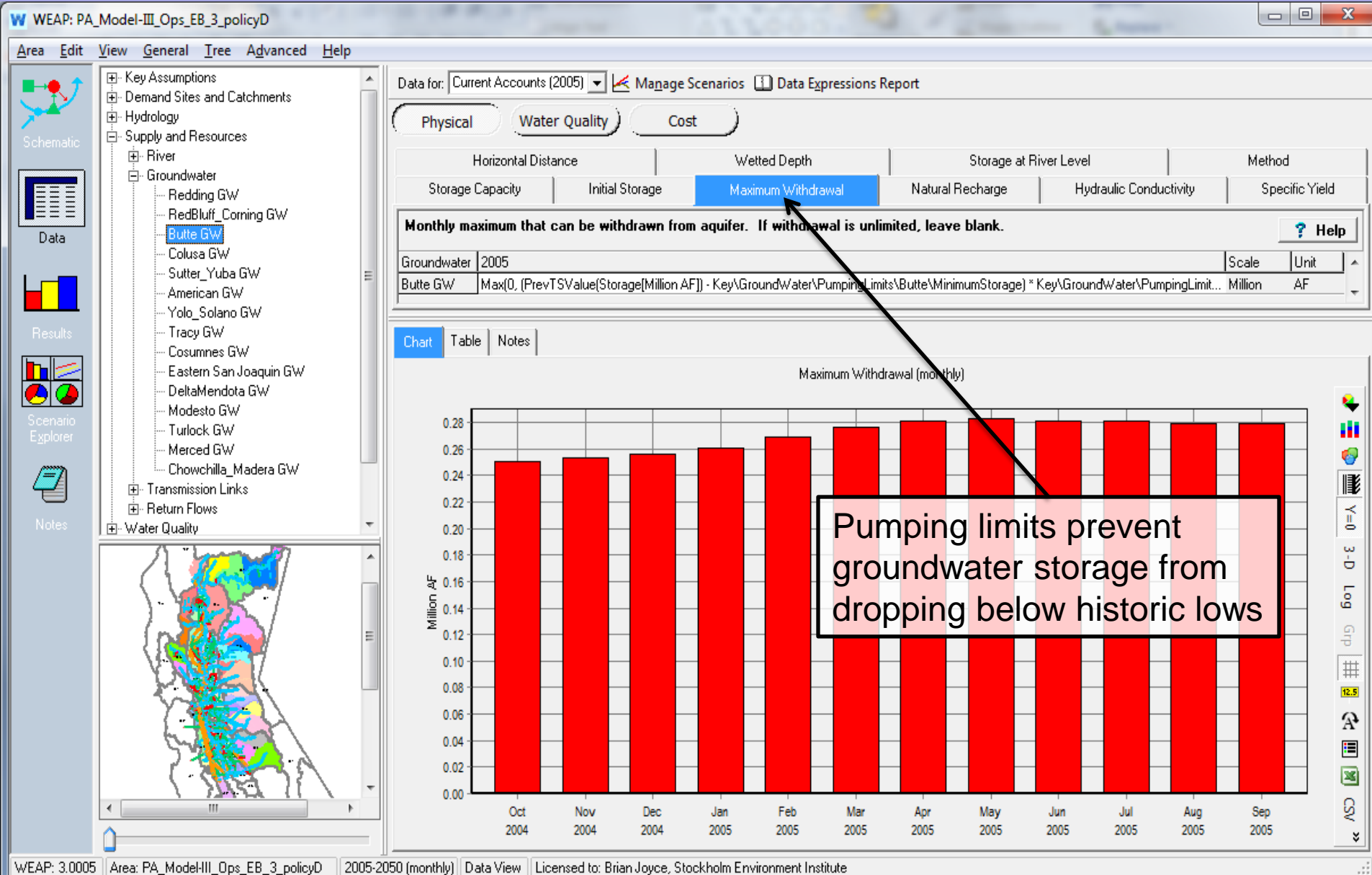
Upper Watersheds



Valley Floor



Groundwater



Sacramento-San Joaquin Delta

- **Water quality considerations:**

Current salinity standards

Saltwater-fresh water interface standards

Currently using GMOD, ANN under development

- **Delta exports**

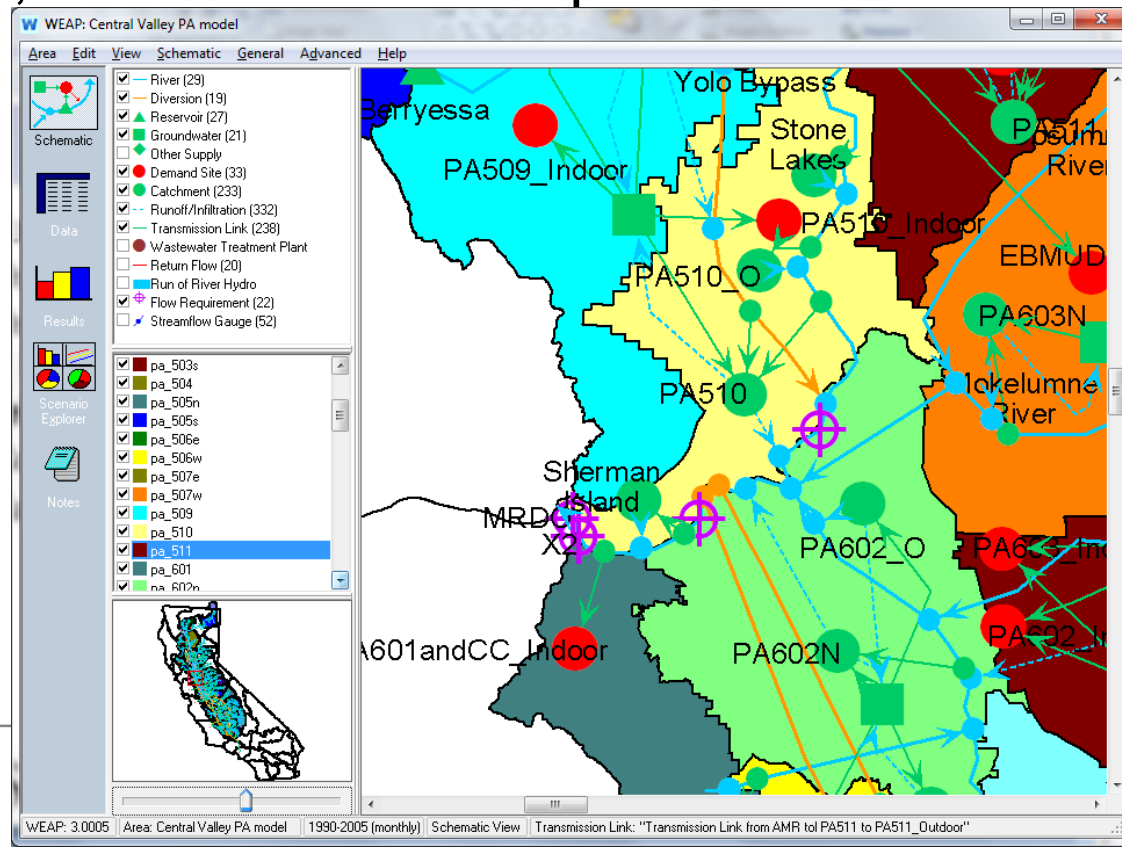
Constrained by VAMP

& 2008 FWS BO

Target San Luis filling

Minimum required

Delta outflows



Central Valley WEAP Model

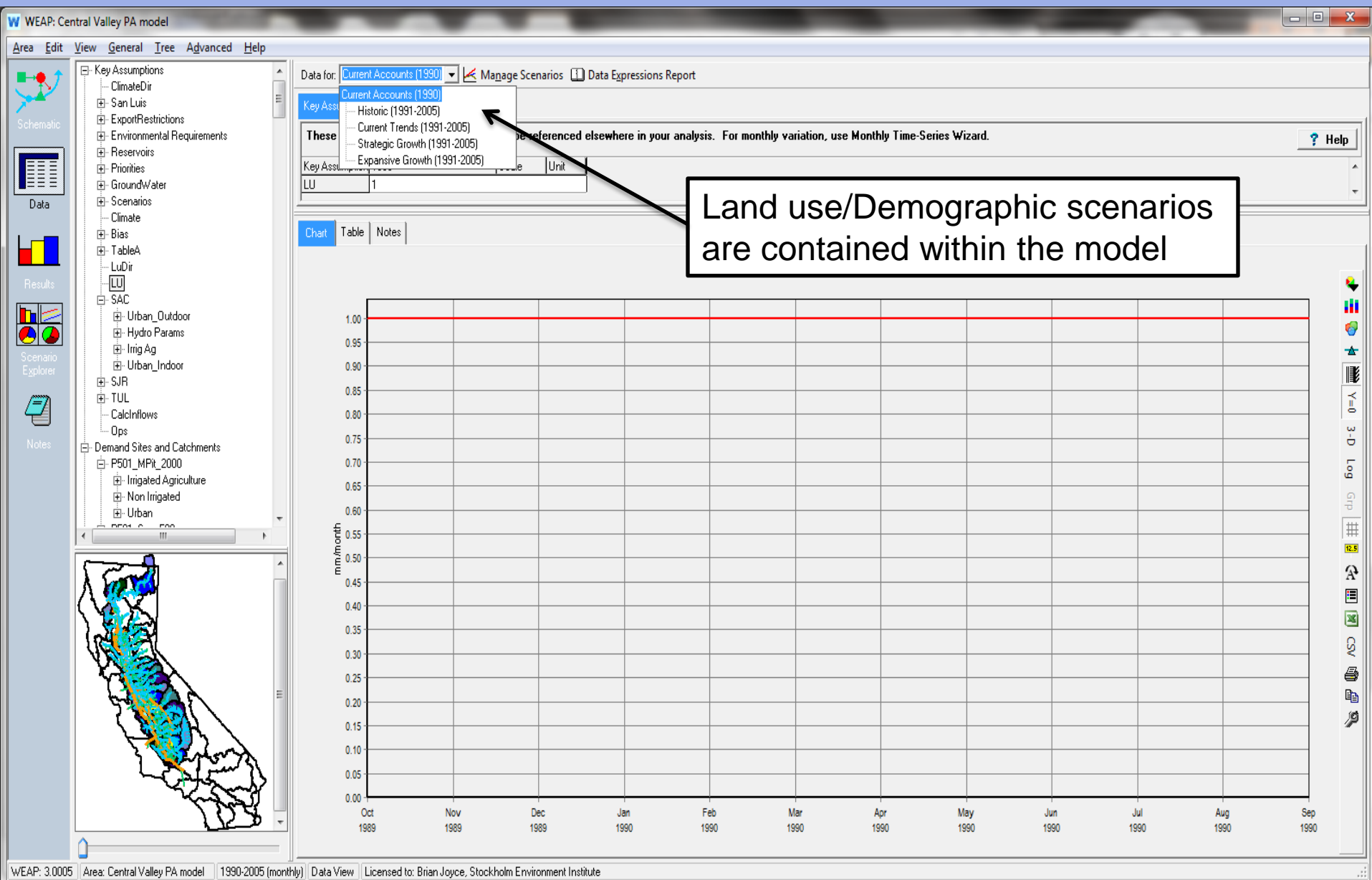
What's included:

- Climate-driven hydrology: supply and demand
- Water supply operations
- Ecosystems: in-stream flow, managed wetlands
- Groundwater
- Water quality: Delta Salinity
- Monthly Bypass Flows

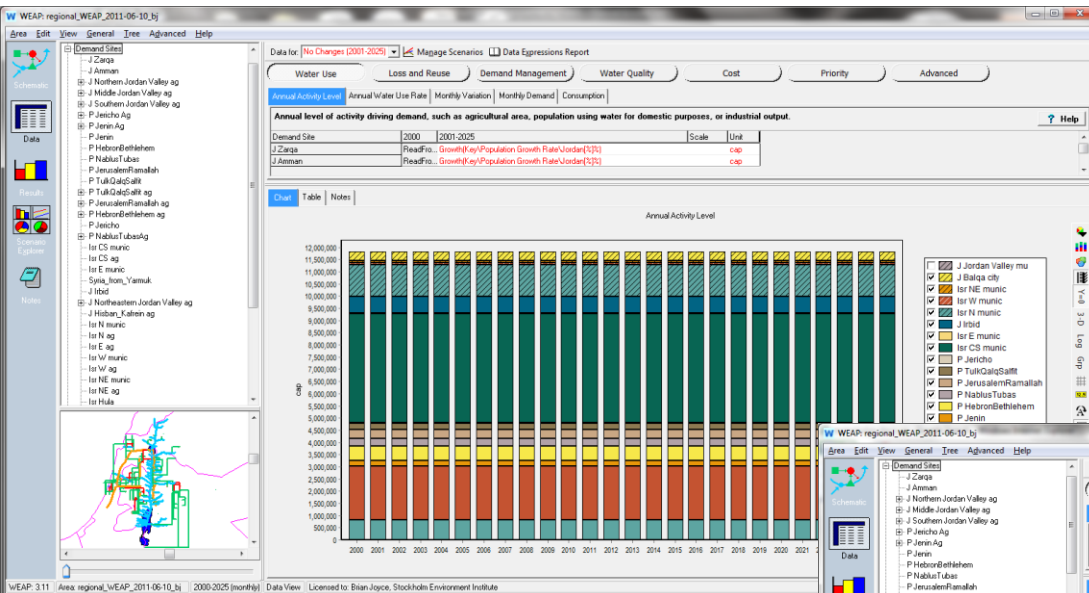
What's NOT included, but could be:

- Economics
- Hydropower
- Water quality: Temperature, BOD

Considering Uncertainty



How will water demand change in the future?



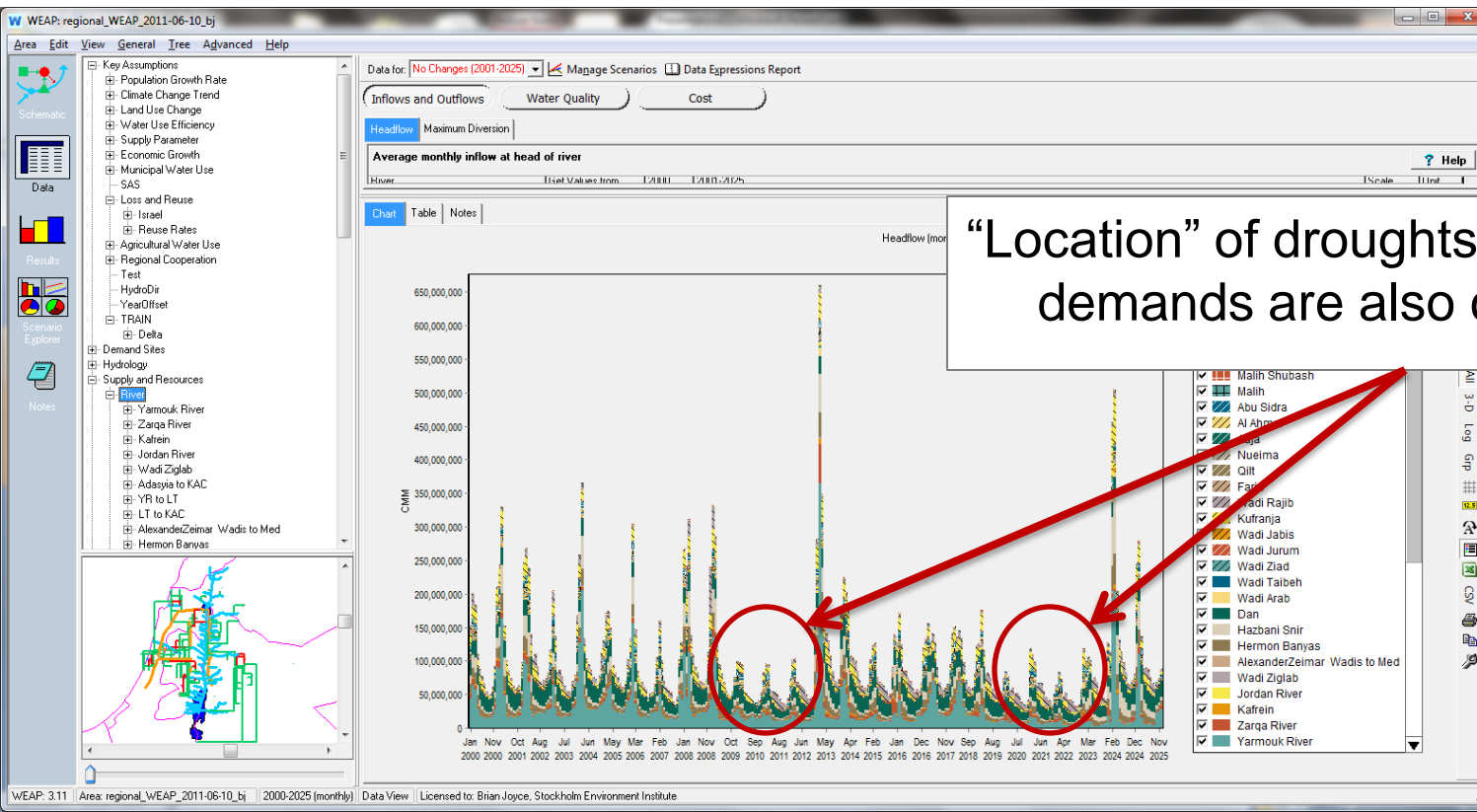
← No changes

Business as
usual



How will water supply change in the future?

What will be the frequency and magnitude of droughts?



Tulare Lake Hydrologic Region

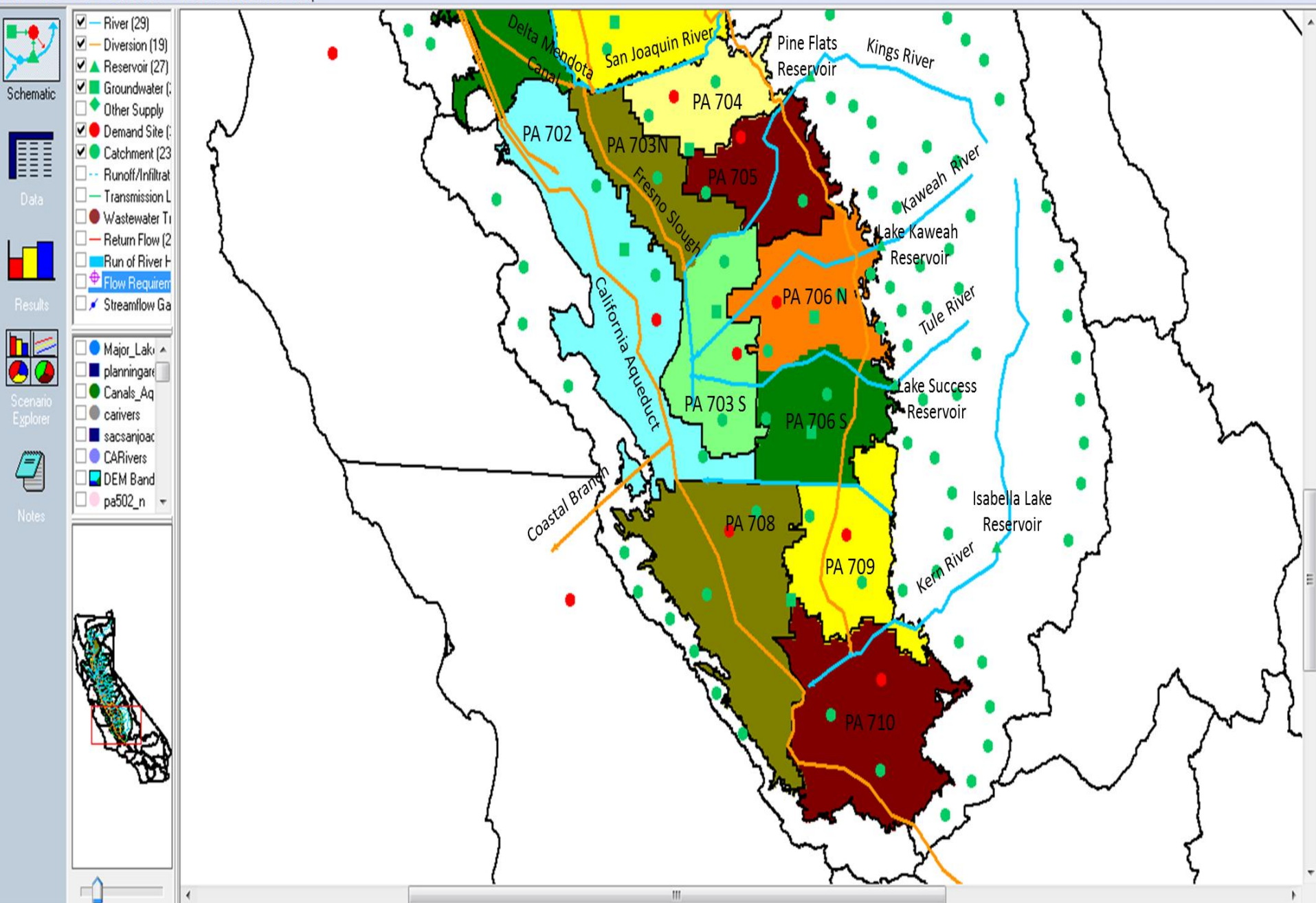
9 rim Sierra watersheds plus 1 lumped inflows from west side
8 valley floor Planning Areas

Each has indoor urban, outdoor urban, and irrigated agricultural demands

Irrigated agriculture in 2 PA's (703 & 706) split based on water supply

2 major canals: California Aqueduct, and Friant-Kern Canal

2 links to out of Valley demands: Central Coast, Southern California



San Joaquin River Hydrologic Region

8 rim Sierra watersheds plus 3 lumped inflows from west side
6 valley floor Planning Areas

Each has indoor urban, outdoor urban, and irrigated agricultural demands

Irrigated agriculture in 3 PA's (602, 603 & 609) split based on water supply

Managed wetlands in 2 PA's (606 & 609S)

3 major canals: California Aqueduct, Delta-Mendota Canal, Madera Canal

2 links of out of Valley demands: Bay Area, Monterey County
Shared CVP and SWP storage in San Luis Reservoir



Schematic



Data



Results



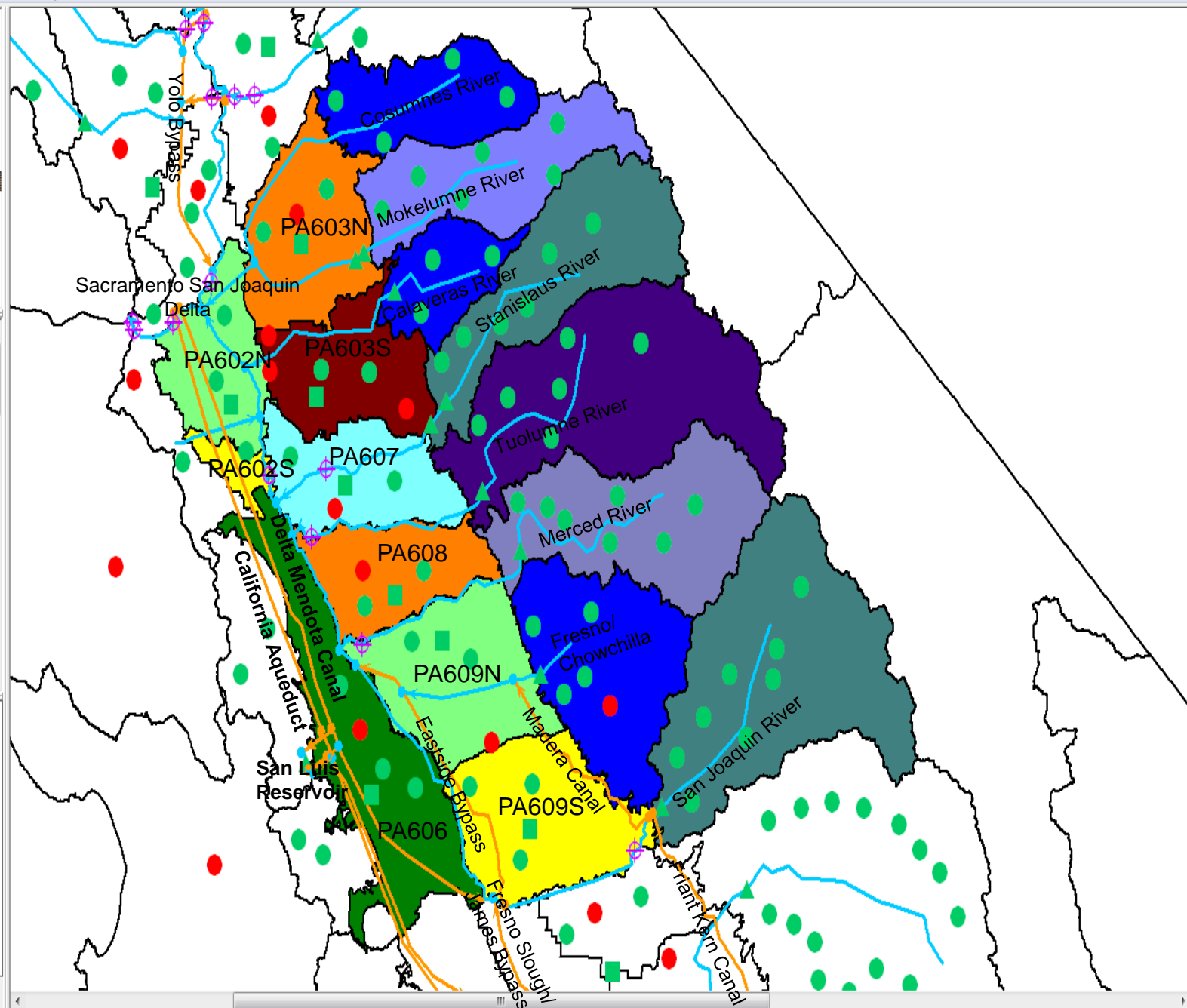
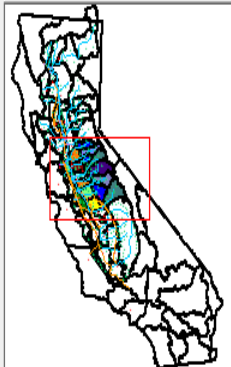
Scenario Explorer



Notes

- ☒ River (29)
- ☒ Diversion (19)
- ☒ Reservoir (27)
- ☒ Groundwater (21)
- ☐ Other Supply
- ☒ Demand Site (33)
- ☒ Catchment (233)
- ☐ Runoff/Infiltration (332)
- ☐ Transmission Link (238)
- ☐ Wastewater Treatment Plant
- ☐ Return Flow (20)
- ☐ Run of River Hydro
- ☒ Flow Requirement (22)
- ☒ Streamflow Gauge (52)

- ☐ Major_Lakes
- ☐ planningareas
- ☐ Canals_Aqueducts_UTM11N
- ☐ canivers
- ☐ sacsantjoquin
- ☐ CARivers
- ☐ DEM Bands
- ☐ pa502_n
- ☐ pa502_c
- ☐ pa502_s
- ☐ cache
- ☐ putah
- ☐ Major_Rivers
- ☒ DAU_Planning_Areas_WEAF
- ☐ pa_502c
- ☐ pa_502n
- ☐ pa_502s
- ☐ pa_503n



Robust Decision Making

- Iterative, analytic process designed to identify strategies that are robust to a wide range of planning uncertainties.



Contact Information



<http://www.weap21.org/>

Brian Joyce

Stockholm Environment Institute

Brian.Joyce@sei-us.org

(530) 220-2111